TITLE: Automatic Straight Umbrella

BACKGROUND OF THE INVENTION

A conventional umbrella being capable of opening and closing automatically is used popularly. The known automatic umbrella includes a shaft provided with inner springs and a wire connecting with a bullet head for engagement. Before use, the shaft of the umbrella must be pressed firstly for compressing the inner springs to provide opening or closing force. The structure of prior umbrella is very complicate, and the springs and the wire as well as the bullet head are all received in the same place of the shaft. The assembly is difficult and it increases possibility of work out.

Accordingly, the present invention is to provide an automatic opening /closing straight umbrella, which provides a novel structure for opening or closing the umbrella automatically. And the structure is simple for assembly that obtains improvement and utility.

BRIEF DESCRIPTION OF THE DRAWINGS

The following drawings indicate the character and improvement of the present invention.

Figure 1 is a plan view showing an automatic straight umbrella before storing energy in closing state according to the present invention.

Figure 2 is a plan view of Figure 1 after pressing a power rod for storing energy.

Figure 3 is a plan view showing the automatic straight umbrella in opening state according to the present invention.

Figure 4 is a cross-sectional plan view of Figure 1.

Figure 5 is a cross-sectional plan view of Figure 2.

Figure 6 is a cross-sectional plan view of Figure 3.

Figure 7 shows enlarged plan views about the controlling button according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring firstly to figure 1 and 4, the present invention relates to an automatic straight umbrella, which can be opened and closed automatically. The umbrella includes a shaft (1), which connects its lower end with a handle (16) and its upper end with an upper joint (13). An outer tube (14) provided around the shaft (1) slidably connects with middle joint (15) at upper end. A runner (4) is provided around the outer tube (14) slidably. The frame (5) has the inner end of each rib to connect with the upper joint (13), the middle joint (15), and the runner (4) respectively. A spring (51) is provided between the frame (5) and the runner (4).

A power rod (2) is provided to insert into the shaft (1) from its lower end. A connector (21) is provided on top of the rod (2), and has a sideward convex (211), which just positions in upper slot (11) of the shaft (1). An upper spring (7) is received in the shaft (1) over the connector (21) while a lower spring (6) is under the connector (21) around the rod (2). The lower spring (6) has its lower end to connect with a sleeve (22) having a sideward convex (221) just positioning in lower slot (12) of the shaft (1). The power rod (2) is provided with a stopper (23) accompanying a coil spring (24) at a position relating to a controlling

button (3) on the handle (16). The controlling button (3) includes an inner coil spring (32) and a tongue (31), which can engage with an aperture (141) on the outer tube (14). The outer tube (14) includes another aperture (142) for receiving the convex (221) of the sleeve (22).

Before use, the power rod (2) is pushed upward into the shaft (1), as shown in Figure 2 and 5 for storing energy. As the stopper (23) is engaged with the relating hole (17) of the shaft (1), the umbrella is ready for use in stable. At this time, the connector (21) can extend the lower spring (6) since the lower end is fixed with the sleeve (22) while the convex (221) is engaged with the outer tube (14). To open the umbrella automatically, one can just presses the button (3) that the tongue (31) leaves the outer tube (14), which can be moved upward as well as the sleeve (22) by the recovery force of the lower spring (6). The middle joint (15) moves upward that causes the frame (5) to lift and the runner (4) to move upward too. Hence, the umbrella is opened automatically.

To close the umbrella, one can press again the button (3). As shown in Figure 3 and 6, the contact face (33) of the button (3) can touch and push the stopper (23) inward at this moment and the engagement of the power rod (2) is released. The rod (2) can be moved downward by the recovery forces of the upper spring (7) and the spring (51), while the umbrella can be closed at the same time.

As shown in Figure 7A to 7C, they disclose enlarged figures for explaining the movement about the controlling button (3) and the stopper (23). When the umbrella is in storing energy state (Figure 7A), the button (3) will prevent from contacting with the stopper (23) always, since the

stopper (23) is covered by the lower end of the outer tube (14), which is formed a thin portion. That avoids from mistouching before the umbrella is opened.

Accordingly, the present invention obtains utility for use and should be allowed for patent.